IN THE CLAIMS:

The following listing of claims will replace all prior versions, and listings, of claims in the application.

1. (Previously Presented) A computer-implemented method comprising:

a computer system receiving user input selecting a plurality of simulation engines corresponding to a value chain;

the computer system assembling in a memory a set of models that represent components of the value chain, wherein each of the models of said set of models includes one or more variables, where each of said one or more variables is defined on a corresponding range, wherein at least one of the models of said set of models is a high-resolution geocellular reservoir model;

the computer system selecting values of the variables in their respective ranges to create instantiated models;

the computer system assembling the instantiated models into a workflow;

the computer system executing the simulation engines on the workflow to generate data output, wherein the simulation engines include one or more physics-based flow simulators for simulating reservoirs, wells and surface-pipeline hydraulics, wherein the simulation engines also include an economic computation engine; and

the computer system storing the selected values of the variables and the data output from the one or more simulation engines to a memory;

the computer system repeatedly performing a set of operations including said selecting, said assembling the instantiated models, said executing and said storing.

2-6. (Canceled)

7. (Original) The method of claim 1, wherein said selecting of values of the variables includes computing quantiles of one or more user-specified probability distributions.

8. (Canceled)

9. (Original) The method of claim 1, wherein said selecting of values of the variables includes choosing a value in a user-specified quantile range $[Q_A, Q_B]$ based on a probability distribution specified by a user for a first one of the variables, wherein A and B are integers between zero and 100 inclusive.

10. (Previously Presented) A computer-implemented method comprising:

a computer system receiving input specifying a user's selection of a plurality of simulation engines associated with a value chain;

the computer system assembling in a memory a set of models that represent components of the value chain, wherein each of the models of said set includes one or more random variables, wherein at least one of the models of the set of models is a high-resolution geocellular reservoir model;

the computer system instantiating the random variables of each model to determine instantiated models, wherein said instantiating the random variables includes instantiating a value of a first one of the random variables, wherein said value is instantiated in a quantile range $[Q_A, Q_B]$ based on a user-specified probability distribution and user-specified integers A and B which are between zero and 100 inclusive;

the computer system assembling the instantiated models into a workflow;

the computer system executing the simulation engines on the workflow to generate data output, wherein the simulation engines include one or more physics-based flow simulators for simulating reservoirs, wells and surface-pipeline hydraulics, wherein the simulation engines also include an economic computation engine; and

the computer system storing the data output from the simulation engines to a memory;

the computer system repeatedly performing a set of operations including said instantiating, said assembling the instantiated models, said executing and said storing.

11-12. (Canceled)

13. (Previously Presented) A computer-implemented method comprising:

a computer system computing an instantiated value of each random variable in a set of random variables;

the computer system selecting a first geocellular reservoir model from a collection of high-resolution geocellular reservoir models based on a first subset of the instantiated values;

the computer system resolving uncertain dates for events in one or more schedules using a second subset of the instantiated values in order to determine resolved event dates in the one or more schedules;

the computer system executing a simulation engine on an input data set including the first geocellular reservoir model and the resolved event dates, wherein the simulation engine includes one or more physics-based flow simulators for simulating reservoirs, wells and surface-pipeline hydraulics, wherein the simulation engine also includes an economic simulator; and

the computer system capturing data generated by the simulation engine in response to said execution to a storage medium;

the computer system repeatedly performing a set of operations, wherein the set of operations includes said computing, said selecting, said resolving, said executing and said capturing.

14-15. (Canceled)

16. (Currently Amended) The method of claim 13, wherein the input data set also includes ~~one or more of~~: a model of reservoir physical characteristics; a well location model; a well plan model; a model that represents a schedule for the drilling of one or more wells; a model that represents a schedule for production from the one or more wells; a capital investment expense model; an operating expense model; and a fiscal regime model.

17. (Previously Presented) A computer system comprising:

a memory storing program instructions;

a processor configured to read the program instructions from the memory, wherein the program instructions are executable by the processor to:

assemble a set of models, wherein each of the models of said set of models includes one or more variables, where each of said one or more variables is defined on a corresponding range, wherein at least one of the models of said set is a high-resolution geocellular reservoir model;

select values of the variables in their respective ranges to create instantiated models;

execute a well-perforator program on one or more well plans included in the instantiated models in order to determine perforation locations for the one or more well plans;

assemble the instantiated models and the perforation locations into a workflow; and

execute a plurality of simulation engines on the workflow, wherein the simulation engines include one or more physics-based flow simulators for simulating reservoirs, wells and surface-pipeline hydraulics, wherein the simulation engines also include an economic computation engine;

repeatedly perform a set of operations, wherein the set of operations includes said selecting, said executing the well-perforator program, said assembling the

instantiated models and the perforation locations, and said executing the simulation engines.

18. (Previously Presented) The computer system of claim 17, wherein the program instructions are executable by the processor to:

store data output from the simulation engines to the memory.

19. (Previously Presented) A computer-readable memory medium storing program instructions, wherein the program instructions are configured to direct one or more computers to:

assemble a set of models, wherein each of the models of said set includes one or more variables, where each of said one or more variables varies in a corresponding range, wherein at least one of the models of said set is a high-resolution geocellular reservoir model;

select values of the variables in their respective ranges to create instantiated models;

execute a well-perforator program on one or more well plans included in the instantiated models in order to determine perforation locations for the one or more well plans;

assemble the instantiated models and the perforation locations into a workflow;

execute a plurality of simulation engines on the workflow, wherein the simulation engines include one or more physics-based flow simulators for simulating reservoirs, wells and surface-pipeline hydraulics, wherein the simulation engines also include an economic computation engine;

repeatedly perform a set of operations, wherein the set of operations includes said selecting, said executing the well-perforator program, said assembling the instantiated models and perforation locations, and said executing the simulation engines.

20. (Previously Presented) The computer-readable memory medium of claim 19, wherein the program instructions are further configured to direct the one or more computers to:

automatically store data output from the simulation engines to a memory.

21. (Previously Presented) A computer-implemented method comprising:

a computer system performing setup operations to assemble a case comprising a set of planning variables and models, wherein at least one of said models is a high-resolution geocellular reservoir model;

the computer system executing a calculation loop a plurality of times, wherein each iteration of the calculation loop includes:

automatically generating instantiations of the planning variables to determine instantiated models from the models;

automatically executing well-perforator software on one or more well plans included in the instantiated models in order to determine perforation locations associated with the one or more well plans;

automatically executing a plurality of simulation engines on the instantiated models and the perforation locations, wherein the simulation engines include one or more physics-based flow simulators for simulating reservoirs, wells and surface-pipeline hydraulics, wherein the simulation engines also include an economic computation engine; and

automatically capturing the instantiated planning variables and output data from the simulation engines onto a storage medium.

22. (Canceled)

23. (Previously Presented) The method of claim 21, wherein said capturing comprises storing the instantiated planning variables and the simulation output data onto the storage

medium in a relational database format.

24. (Previously Presented) The method of claim 21, wherein said generating instantiations of the planning variables includes:

calculating a set of random numbers; and

calculating quantile values using the random numbers and user-defined probability distributions associated with the planning variables.

25-26. (Canceled)

27. (Previously Presented) The method of claim 21, wherein said performing setup operations includes receiving user input specifying execution qualifying data corresponding to the case, wherein the execution qualifying data includes a set of attainable values for each planning variable.

28. (Original) The method of claim 27, wherein the execution qualifying data includes a number of iterations of the calculation loop.

29. (Canceled)

30. (Original) The method of claim 27, wherein the execution qualifying data include data characterizing probability distributions for one or more of the planning variables.

31-41. (Canceled)

42. (Previously Presented) A computer-implemented method comprising:

a computer system receiving user input characterizing probability distributions for planning variables associated with a set of models, wherein the set of models includes one or more high-resolution geocellular reservoir models;

the computer system generating instantiated values of the planning variables;

the computer system assembling one or more input data sets for a plurality of simulation engines from the set of models and the instantiated values, wherein said assembling includes resolving uncertain event dates in one or more schedules included in the set of models based on a first subset of the instantiated values;

the computer system executing a well perforator program based on a second subset of the set of models and a second subset of the instantiated values.

the computer system executing the simulation engines on the one or more input data sets, wherein the simulation engines include one or more physics-based flow simulators for simulating reservoirs, wells and surface-pipeline hydraulics, wherein the simulation engines also include an economic computation engine;

the computer system storing the instantiated values of the planning variables and data output from the simulation engines to a storage medium; and

the computer system repeatedly performing a set of operations, wherein the set of operations includes said generating, said assembling, said executing a well perforator, said executing the simulation engines, and said storing until a termination condition is achieved.

43-44. (Canceled)

45. (Previously Presented) The method of claim 42 further comprising: executing a reservoir model scaling engine to scale said one or more high-resolution geocellular reservoir models of said set of models to a lower resolution.

46-47. (Canceled)

48. (Previously Presented) A computer-implemented method comprising:

(a) a computer system receiving user input characterizing a set of planning variables associated with a set of models;

(b) the computer system generating instantiated values of the planning variables;

(c) the computer system assembling a first input data set using a first subset of the instantiated values and a first subset of the set of models, and assembling a second input data set using a second subset of the instantiated values and a second subset of the set of models, wherein the first subset of the set of models includes a high-resolution geocellular reservoir model;

(d) the computer system executing a well-perforator program to determine well perforation locations for wells in the first input data set, and appending the well perforation locations to the first input data set;

(e) the computer system determining instantiated schedules using a third subset of the instantiated values and a third subset of the models, and appending the instantiated schedules to the first input data set and the second input data set;

(f) the computer system executing one or more physics-based flow simulators on the first input data set to generate flow data for oil, gas and water and appending the flow data to the second input data set, wherein the one or more physics-based flow simulators are configured to simulate reservoirs, wells and surface-pipeline hydraulics;

(g) the computer system executing an economic computation engine on the second input data set to generate economic output data;

(h) the computer system storing the instantiated values of the planning variables, the flow data and the economic output data to a storage medium in a relational database format; and

(i) the computer system repeating a set of operations until a termination condition is achieved, wherein the set of operations includes (b), (c), (d), (e), (f), (g) and (h).

49. (Previously Presented) The computer-implemented method of claim 1, wherein the data output is useable to estimate an economic value of one or more of the reservoirs, wells and surface-pipeline hydraulics.

50. (Previously Presented) The method of claim 1, wherein said selecting of values of the variables is based on a Latin Hypercube sampling of the variables.

51. (Previously Presented) The method of claim 1, wherein said repeatedly performing covers all possible combinations of values of the variables in their respective ranges.

52. (Previously Presented) The method of claim 1, wherein said repeatedly performing uses an experimental design algorithm to generate combinations of variable values in each iteration of said repeating.

53. (Previously Presented) The method of claim 13, wherein said computing is based on a Latin Hypercube sampling of the random variables.

54. (Previously Presented) The method of claim 1, wherein the set of models includes a tax model, a royalty model, a capital expenditure model and an operating expenditure model.

55. (Previously Presented) The method of claim 54, wherein the set of models includes a facility model, wherein the facility model specifies a set of objects including wells, platforms, pipelines and processing plants, wherein the facility model also specifies interconnections between objects of said set of objects, wherein the facility model specifies constraints on production rates and pressure for each of the objects in said set of objects.

56. (Previously Presented) The method of claim 1, wherein the set of models includes a hierarchical tree of models, wherein at least one of the instantiated models is a leaf of the hierarchical tree, wherein two or more of said selected values specify a path from a root of the hierarchical tree to the leaf of the hierarchical tree.